

CLAIMS

1     1. A method for limiting error propagation due to scrambler seed value  
2 transmission errors in a wireless communication network comprising at least one  
3 transmitting device 1 and at least one receiving device 2, wherein each transmitting  
4 device 1 has an associated transmitting address and each receiving device 2 has at  
5 least one associated receiving address, wherein each transmitting device 1 applies a  
6 forward error correction code to transmitted messages followed by scrambling of the  
7 message, and the scrambling is generated from a seed value, and each transmitted  
8 message is structured in such a manner that said seed value can be inferred at a  
9 receiving device 2 in the case of an error-free received message, the method  
10 comprising the steps of:

11                 -providing state information at the transmitting device 1 for each message  
12 transmitted from said transmitting device 1 in such a manner that the transmitting  
13 device 1 can generate a sequence of seed values associated with each receiving  
14 address,

15                 -providing state information at the receiving device 2 for each received  
16 message in such a manner that the receiving device 2 can generate sequences of seed  
17 values, each sequence associated with a unique combination of a transmitting address  
18 and a receiving address,

19                 -the transmitting device 1 attempting to retrieve state information regarding a  
20 receiving address associated with the receiving device 2,

21                 -if no state information is retrievable by said transmitting device 1 such state  
22 information is generated by an arbitrary method in order to generate a new seed value  
23 for a message to be transmitted,

24                 -if state information is retrievable by said transmitting device 1, this  
25 information is utilized to initialize a first seed-generating algorithm in order to  
26 generate a new seed value for the message to be transmitted, and is updated by said  
27 algorithm,

28            -applying a scrambling algorithm initialized by the new seed value to said  
29 message to be transmitted, thereby creating a scrambled message,  
30            -transmitting the scrambled message from said transmitting device 1,  
31            -receiving and descrambling the scrambled message at said receiving device 2,  
32 based on the seed value deduced from the received message,  
33            -checking the received descrambled message for errors that are not corrected  
34 by the forward error correction code,  
35            -using received messages that are free from errors to synchronize a second  
36 seed-generating algorithm in said receiving device 2 with said first seed-generating  
37 algorithm in said transmitting device 1,  
38            -using a current local seed value in said receiving device 2 to attempt to correct  
39 errors in the descrambled message caused by an incorrect received seed.

1        2.     A method according to claim 1, wherein said receiving device 2 performing a  
2 search of some or all of the current local seed values of each seed sequence at the  
3 receiving device 2 and using each such seed value from the search in an attempt to  
4 correctly receive the message.

1        3.     A method according to claim 1, wherein using said current local seed value in  
2 said receiving device 2 to synchronize said second seed-generating algorithm in the  
3 receiving device 2 with said first seed-generating algorithm in said transmitting device  
4 1, if the message is free from errors following the attempt to correct errors in the  
5 descrambled message caused by an incorrect received seed.

1        4.     A method according to claim 1, wherein said first seed-generating algorithm at  
2 the transmitting device 1 generating the same sequence of seed value as said second  
3 seed-generating algorithm at the receiving device 2, when correctly synchronized.

1        5.     A method according to claim 1, further comprising the step of determining the  
2 next seed value in said sequence of seed values at the transmitting device 1 from at  
3 least the current seed value.

- 1    6. A method according to claim 1, further comprising the step of causing said
- 2    first seed-generating algorithm at said transmitting device 1 to move to the next seed
- 3    value in said sequence of seed values at the transmitting device 1 and update the state
- 4    information for said receiving address for each transmitted message.
  
- 1    7. A method according to claim 1, further comprising the step of causing said
- 2    second seed-generating algorithm at said receiving device 2 to move to the next seed
- 3    value in said sequence of seed values at the receiving device 2 and update the state
- 4    information for said transmitting and receiving addresses for each correctly received
- 5    message.

1       8. A method for limiting error propagation due to scrambler seed value  
2       transmission errors in a wireless communication network the method comprising the  
3       steps of:

4             -providing state information at a transmitting device for each message  
5       transmitted from said transmitting device,

6             -providing state information at a receiving device for each received message,

7             -attempting to retrieve state information by the transmitting device regarding a  
8       receiving address associated with the receiving device,

9             -if no state information is retrievable by said transmitting device such state  
10      information is generated by an arbitrary method in order to generate a new seed value  
11      for a message to be transmitted,

12             -if state information is retrievable by said transmitting device, this information  
13      is utilized to initialize a first seed-generating algorithm in order to generate a new seed  
14      value for the message to be transmitted, and is updated by said algorithm,

15             -applying a scrambling algorithm initialized by the new seed value to said  
16      message to be transmitted, thereby creating a scrambled message,

17             -transmitting the scrambled message from said transmitting device,

18             -receiving and descrambling the scrambled message at said receiving device,  
19      based on the seed value deduced from the received message,

20             -checking the received descrambled message for errors that are not corrected  
21      by a forward error correction code.

1       9. A method according to claim 8, further comprising the steps of

2             -using received messages that are free from errors to synchronize a second  
3       seed-generating algorithm in said receiving device with said first seed-generating  
4       algorithm in said transmitting device,

5             -using a current local seed value in said receiving device to attempt to correct  
6       errors in the descrambled message caused by an incorrect received seed.

- 1    10. A method according to claim 9, wherein said receiving device performing a
- 2    search of some or all of the current local seed values of each seed sequence at the
- 3    receiving device and using each such seed value from the search in an attempt to
- 4    correctly receive the message.
  
- 1    11. A method according to claim 9, wherein using said current local seed value in
- 2    said receiving device to synchronize said second seed-generating algorithm in the
- 3    receiving device with said first seed-generating algorithm in said transmitting device,
- 4    if the message is free from errors following the attempt to correct errors in the
- 5    descrambled message caused by an incorrect received seed.
  
- 1    12. A method according to claim 9, wherein said first seed-generating algorithm at
- 2    the transmitting device generating the same sequence of seed value as said second
- 3    seed-generating algorithm at the receiving device, when correctly synchronized.
  
- 1    13. A method according to claim 9, further comprising the step of determining the
- 2    next seed value in said sequence of seed values at the transmitting device 1 from at
- 3    least the current seed value.
  
- 1    14. A method according to claim 9, further comprising the step of causing said
- 2    first seed-generating algorithm at said transmitting device 1 to move to the next seed
- 3    value in said sequence of seed values at the transmitting device 1 and update the state
- 4    information for said receiving address for each transmitted message.
  
- 1    15. A method according to claim 9, further comprising the step of causing said
- 2    second seed-generating algorithm at said receiving device 2 to move to the next seed
- 3    value in said sequence of seed values at the receiving device 2 and update the state
- 4    information for said transmitting and receiving addresses for each correctly received
- 5    message.